

IN THE CLAIMS

Please amend the Claims as follows.

Please cancel Claims 1-46.

Please add the following new Claims:

~~47~~. A method of forming copper interconnects in the fabrication of an integrated circuit device comprising:

providing a substrate having a point of electrical contact in or on a surface of said substrate and having a first insulating layer overlying said substrate;

forming a first copper interconnect to said electrical contact through an opening in said first insulating layer wherein said first copper interconnect comprises a first single via isolated from other vias and an overlying first copper line; and

forming a slot in said first copper line adjacent to said first single via wherein said slot provides stress relief at the interface of said first single via and said first copper line.

~~48~~ The method according to Claim 47 further comprising:

forming a second insulating layer overlying said first copper interconnect; and

forming a second copper interconnect through said second insulating layer to said first copper interconnect wherein said second copper interconnect comprises a second single via isolated from other vias and a second overlying copper line.

~~49.~~ The method according to Claim 47 wherein said first copper line has a width of more than about 0.2 μ m.

~~50.~~ The method according to Claim 48 wherein said second copper line has a width of more than about 0.2 μ m.

~~51.~~ The method according to Claim 48 wherein said slot in said first copper line provides stress relief at the interface of said second single via and said second copper line.

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~~52.~~ The method according to Claim 48 further comprising forming a slot in said second copper line adjacent to said second single via wherein said slot in said second copper line provides stress relief at the interface of said second single via and said second copper line.

~~53.~~ The method according to Claim 47 wherein said slot comprises:

a first slot spaced a first distance from said first single via in an X-direction;

a second slot spaced a second distance from said first single via in an X-direction opposite from said X-direction of said first slot; and

a third slot spaced a third distance from said first single via in a Y-direction.

~~54.~~ The method according to Claim 53 wherein said first, second, and third slots have a rectangular or square shape.

55. The method according to Claim 53 wherein said third slot overlaps said first slot by a fourth distance and wherein said third slot overlaps said second slot by a fifth distance.

56. The method according to Claim 53 wherein said first distance is between about 0.1 and 0.4 μm .

57. The method according to Claim 53 wherein said second distance is between about 0.1 and 0.4 μm .

58. The method according to Claim 53 wherein said third distance is between about 0.05 and 0.3 μm .

59. The method according to Claim 55 wherein said fourth distance is between about 0.1 and 0.5 μm .

60. The method according to Claim 55 wherein said fifth distance is between about 0.1 and 0.5 μm .

61. The method according to Claim 53 wherein said first slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm .

62. The method according to Claim 53 wherein said second slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm .

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~~63.~~ The method according to Claim 53 wherein said third slot has dimensions of between about 0.1 and 0.5 μ m by between about 0.9 and 1.5 μ m.

~~64.~~ The method according to Claim 52 wherein said slot in said second copper line comprises:

a first slot spaced a first distance from said second single via in an X-direction;

a second slot spaced a second distance from said second single via in an X-direction opposite from said X-direction of said first slot; and

a third slot spaced a third distance from said second single via in a Y-direction.

A' cont. ~~65.~~ The method according to Claim 64 wherein said first, second, and third slots have a rectangular or square shape.

~~66.~~ The method according to Claim 64 wherein said third slot overlaps said first slot by a fourth distance and wherein said third slot overlaps said second slot by a fifth distance.

~~67.~~ The method according to Claim 64 wherein said first distance is between about 0.1 and 0.4 μ m, said second distance is between about 0.1 and 0.4 μ m, and said third distance is between about 0.05 and 0.3 μ m.

68. The method according to Claim 66 wherein said fourth distance is between about 0.1 and 0.5 μ m and said fifth distance is between about 0.1 and 0.5 μ m.

69. The method according to Claim 64 wherein said first slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , said second slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , and said third slot has dimensions of between about 0.1 and 0.5 μm by between about 0.9 and 1.5 μm .

70. A method of forming copper interconnects in the fabrication of an integrated circuit device comprising:

providing a first copper line over a substrate;

forming a insulating layer overlying said first copper line;

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forming a copper interconnect to said first copper line through an opening in said insulating layer wherein said copper interconnect comprises a single via isolated from other vias and an overlying second copper line; and

forming a slot in one or more of said first and second copper lines adjacent to said single via wherein said slot provides stress relief at the interface of said single via and said one or more of said first and second copper lines.

71. The method according to Claim 70 wherein said slot comprises:

a first slot spaced a first distance from said first single via in an X-direction;

a second slot spaced a second distance from said first single via in an X-direction opposite from said X-direction of said first slot; and

a third slot spaced a third distance from said first single via in a Y-direction.

~~72.~~ The method according to Claim 71 wherein said first, second, and third slots have a rectangular or square shape.

73. The method according to Claim 71 wherein said third slot overlaps said first slot by a fourth distance and wherein said third slot overlaps said second slot by a fifth distance.

~~74.~~ The method according to Claim 71 wherein said first distance is between about 0.1 and 0.4 μm , said second distance is between about 0.1 and 0.4 μm , and said third distance is between about 0.5 and 3.0 μm .

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75. The method according to Claim 73 wherein said fourth distance is between about 0.1 and 0.5 μm and said fifth distance is between about 0.1 and 0.5 μm .

~~76.~~ The method according to Claim 71 wherein said first slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , said second slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , and said third slot has dimensions of between about 0.1 and 0.5 μm by between about 0.9 and 1.5 μm .

~~77.~~ The method according to Claim 70 wherein said first and second copper lines have a width of more than about 0.2 μm .

78. An integrated circuit device comprising:

a first copper line over a substrate;

an insulating layer overlying said first copper line; and

a copper interconnect to said first copper line through an opening in said insulating layer wherein said copper interconnect comprises a single via isolated from other vias and an overlying second copper line wherein a slot in one or more of said first and second copper lines adjacent to said single via provides stress relief at the interface of said single via and said one or more of said first and second copper lines.

79. The device according to Claim 78 further comprising:

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a dielectric layer overlying said substrate and underlying said first copper line wherein an electrical contact lies in or on said substrate; and

a first copper via through said dielectric layer connecting said electrical contact and said first copper line wherein said first copper via is isolated from other vias and wherein said slot is formed at least in said first copper line adjacent to said first copper via.

80. The device according to Claim 78 wherein said slot in said first copper line provides stress relief at the interface of said first copper via and said first copper line.

81. The method according to Claim 78 wherein said first and second copper lines have a width of more than about 0.2 μ m.

82. The method according to Claim 78 wherein said slot comprises:

a first slot spaced a first distance from said first single via in an X-direction;

a second slot spaced a second distance from said first single via in an X-direction opposite from said X-direction of said first slot; and

a third slot spaced a third distance from said first single via in a Y-direction.

83. The method according to Claim 82 wherein said first, second, and third slots have a rectangular or square shape.

84. The method according to Claim 82 wherein said third slot overlaps said first slot by a fourth distance and wherein said third slot overlaps said second slot by a fifth distance.

85. The method according to Claim 82 wherein said first distance is between about 0.1 and 0.4 μm , said second distance is between about 0.1 and 0.4 μm , and said third distance is between about 0.05 and 0.3 μm .

86. The method according to Claim 84 wherein said fourth distance is between about 0.1 and 0.5 μm and said fifth distance is between about 0.1 and 0.5 μm .

87. The method according to Claim 82 wherein said first slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , said second slot has dimensions of between about 0.1 and 0.5 μm by between about 0.5 and 1.0 μm , and said third slot has dimensions of between about 0.1 and 0.5 μm by between about 0.9 and 1.5 μm .
